Overview of Current Efforts in Industrial GHG Benchmarking

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Industry is a major source of greenhouse gas emissions

- One fifth of global GHG emissions
  - Fossil fuel combustion and process emissions
  - Over one quarter when electricity considered
- Also one fifth of Washington state GHG emissions
- Over a fifth of global emissions reduction potential (McKinsey)

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A handful of sectors account for large majority of industrial GHG emissions

- Iron & steel
- Nonferrous metals (aluminum)
- Chemicals and fertilizers
- Petroleum refining
- Minerals (including cement and glass)
- Pulp and paper

… represent 85% of industrial energy use and most process GHG emissions (IPCC, 2007)

Energy and emissions intensive sectors

- Energy (carbon) costs represent a greater fraction of production cost and product value
- Many are subject to international competition, and
- Manufacture products that could be instrumental in a transition to low-carbon economy

Most energy and emissions intensive sectors are present in WA state

Sector	Contribution to WA Emissions	Major facilities in WA state (>25ktCO2e/yr)
Aluminum	High	Alcoa, Kaiser
Cement	High	Ash Grove, Lafarge
Chemical	Low	Solvay, Emerald Kalama
Food Processing	Medium	Many
Glass	Low	Cardinal, St. Gobain
Oil refineries	High	Several
Pulp and Paper	High	Many
Steel	Low	Nucor, Jorgenson

The impetus for industry GHG benchmarking in WA state

- Executive Order 09-05 directs the Department of Ecology to develop greenhouse gas benchmarks
  - By industry for industry sectors that might be covered by federal or regional cap-and-trade program
  - To support use for allowance distribution and to recognize businesses that have made investments in emissions reduction
  - Based on best practices: highly efficient, low emitting facilities
  - For application as state-based emissions standards if needed to complement, or in absence of, federal program

Ecology's process for moving forward

- Phase I (to June 2010): Benchmarking Issues and Options
  - White Paper and Symposium
- Phase II (July 2010 to June 2011): Development of Benchmarks for Some Sectors
- Focus on Washington State industries
- Engagement at regional and federal levels

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What is a GHG Benchmark?

- GHG emissions per unit of output

$$\text{Benchmark} = \frac{\text{Emissions}}{\text{Unit of Output}}$$

- Enables comparison across facilities against a common standard
- Used in a variety of industries and contexts worldwide

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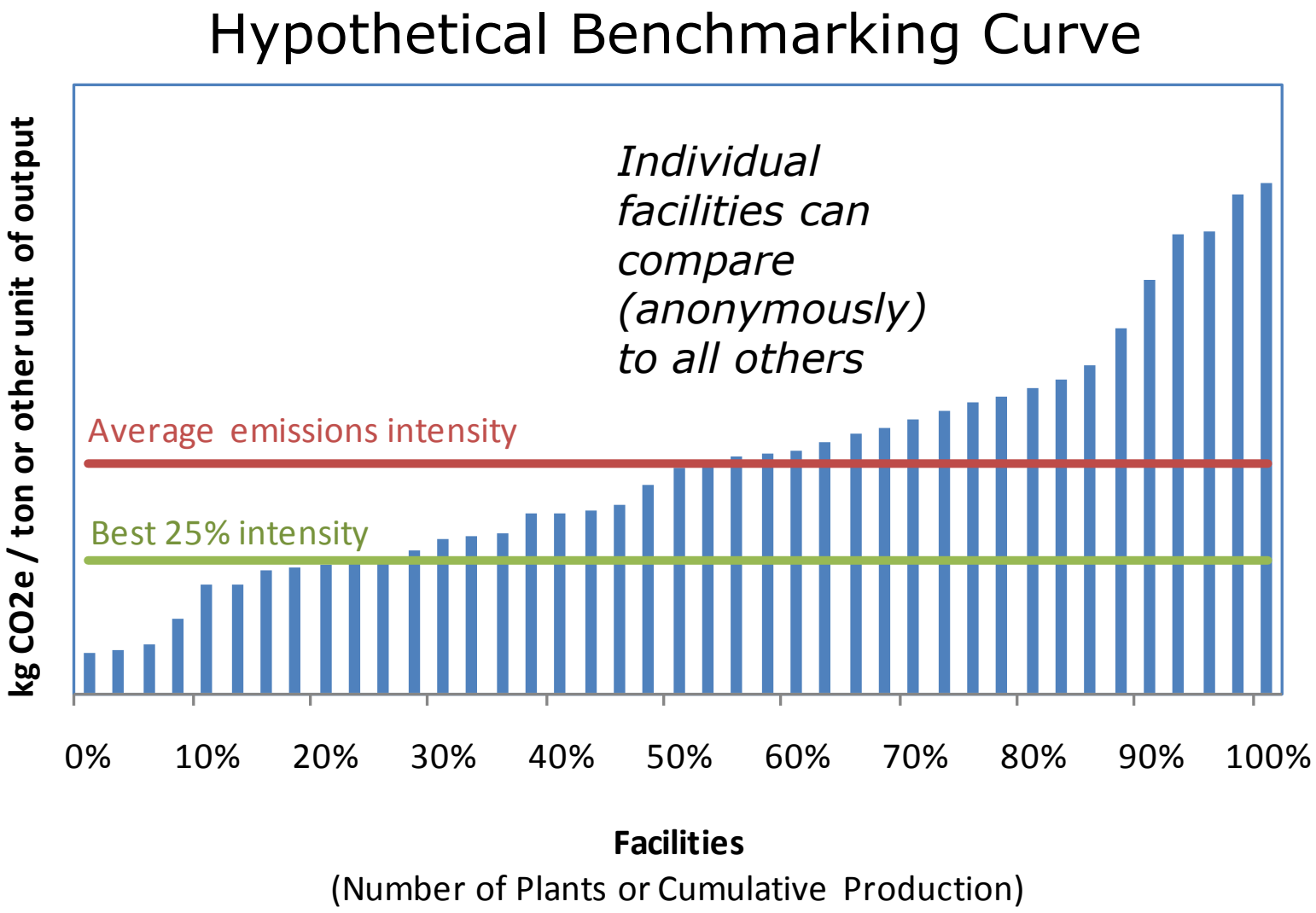
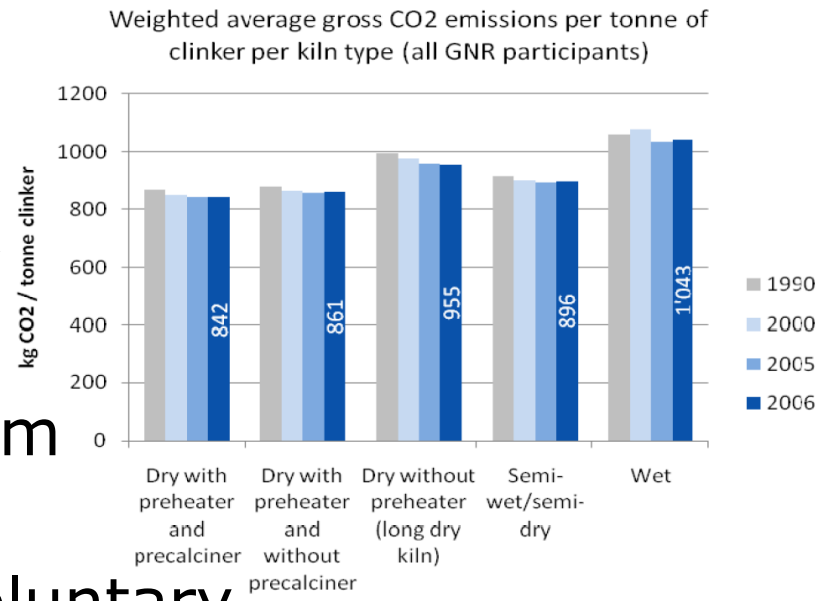
Comparison among facilities requires data and (often) confidentiality agreements



Voluntary industry and government efforts have relied on benchmarking

…to identify best practices and promote enhanced energy and emissions performance:

- US EPA's EnergyStar program
- Cement Sustainability Initiative
- International Aluminum Institute
- German and Dutch voluntary industry agreements



Source: Global data from Cement Sustainability Initiative, 2009. "Getting the Numbers Right".

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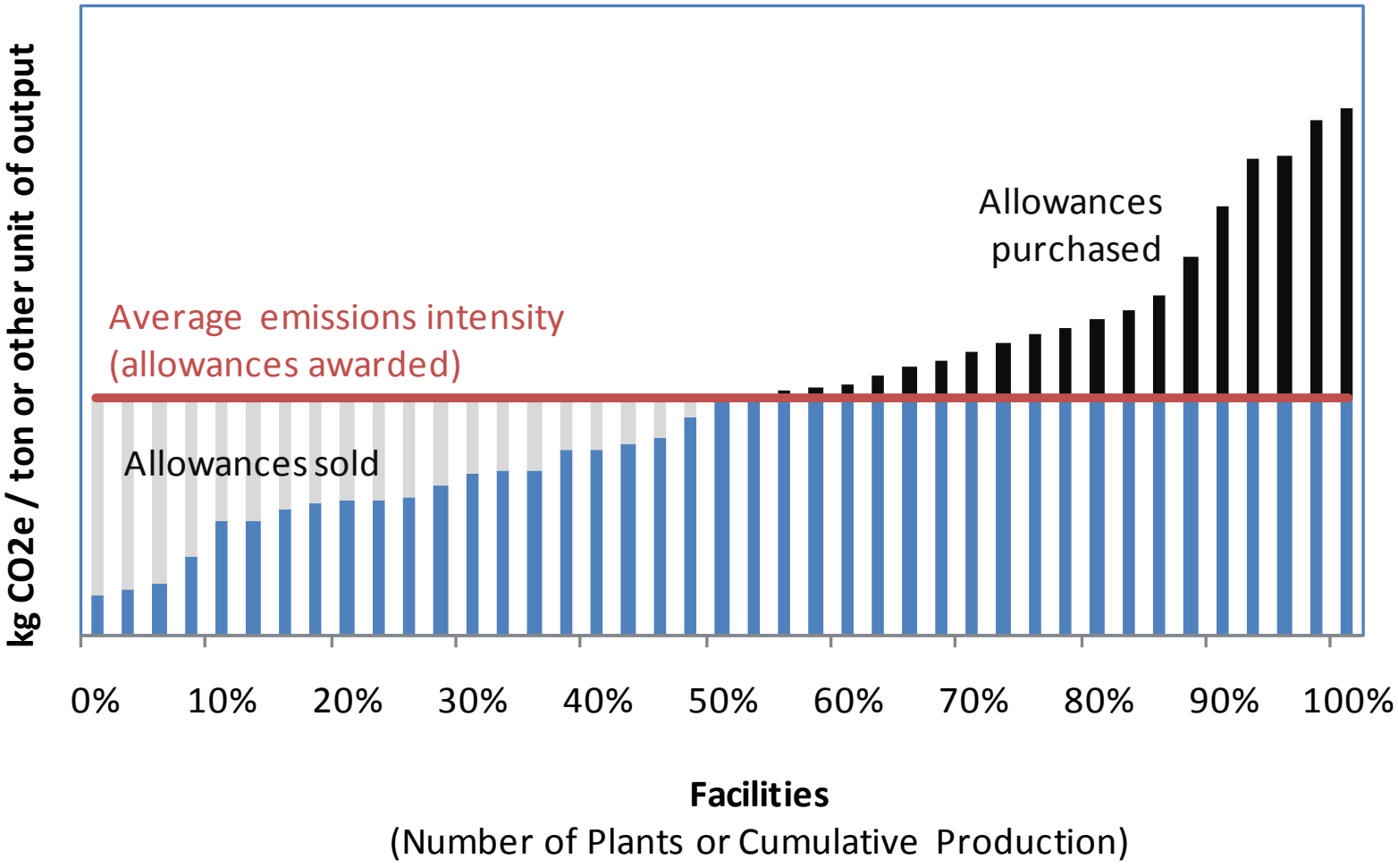
Cap-and-Trade programs may use benchmarks for allowance allocation

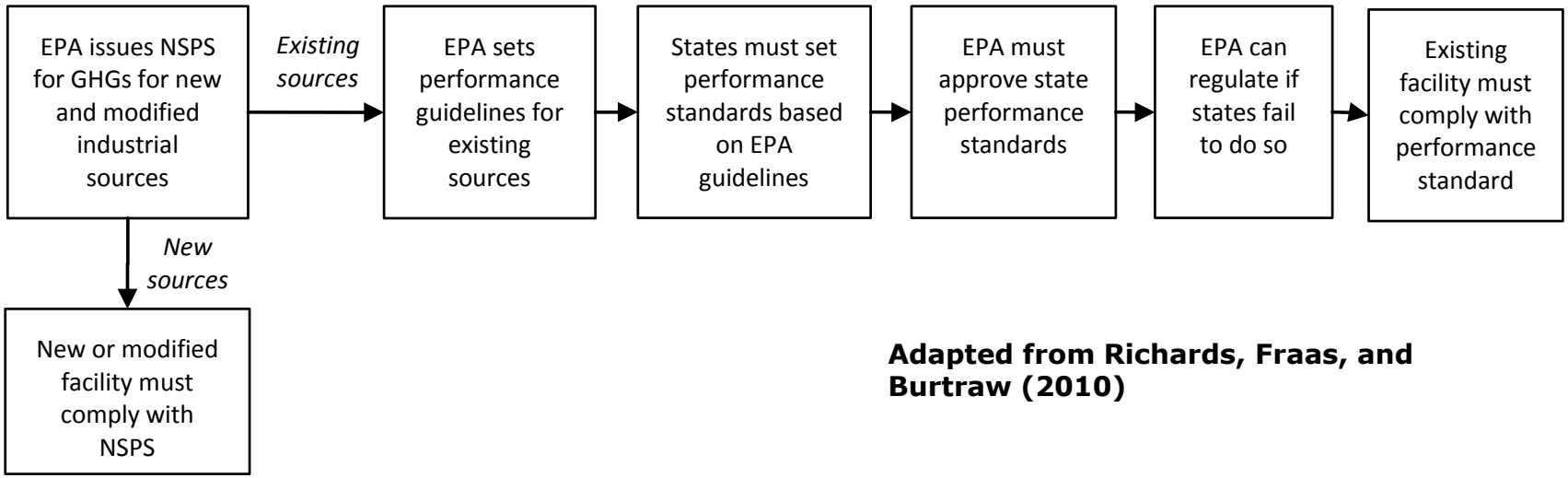
- Output-based rebates to emissions-intensive, trade-exposed industries can limit carbon leakage and maintain competitiveness of domestic industries…
  - Proposed US legislation (Kerry-Lieberman, Waxman-Markey)
  - European Union Emission Trading System (EU ETS)
  - Australian Carbon Pollution Reduction Scheme

Waxman-Markey/Kerry-Lieberman bills use US average emission intensity as benchmark for allocation



Regulatory emissions performance standards can employ benchmarks

- Large stationary sources under the Clean Air Act:



Adapted from Richards, Fraas, and Burtraw (2010)

- WA already has a GHG performance standard (benchmark) for new power projects (ESSB 6001)
  - 1100 lbs CO2e/MWh for baseload generation or long-term contracts
  - And output-based performance standards for other pollutants

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Development of benchmarks poses several challenges

- **Ambition** – average, best available, top percentile?
- **Scope and boundaries** – direct only or total, including indirect?

Benchmark = Emissions / Unit of Output

- **Choice of unit and level of aggregation**: Sector, product, activity
  - **Data** sources

All facets influenced by benchmark application

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Specific issues GHG benchmarking must address

- **Combined heat and power**, or use of waste gases (paper and pulp, steel, and others)
- **Feedstock quality and quantity**: Use and quality of recovered/recycled feedstock (glass, aluminum, steel)
- **Facilities that produce multiple products** (paper or steel mills)
- **Integrated vs. non-integrated facilities** (paper and pulp and steel)
- **Alternative definitions of the final product** (e.g. cement or clinker)

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Other key points

- Benchmarks should be based on facility performance at regional, national or international levels
  - WA state has leading industries in energy and environmental performance
- Benchmark design will depend upon the policy application

Questions to consider

- What are the benefits and challenges of developing and applying benchmarks?
- What approaches to benchmark development and use seem the most promising for managing GHG emissions?
- What would make a Phase II effort on benchmarking (July 2010-June 2011) most useful from your perspective?

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For more information

- Website: http://www.ecy.wa.gov/climatechange/GHGbenchmarking.htm
- Draft White Paper Comment Period through June 4
- Contact us at benchmarking.wa@sei-us.org

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